

# Only women can whisper to gods: Voodoo, menopause and women's autonomy<sup>1</sup>

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## Abstract

In various parts of the world women gain autonomy as they get older. We hypothesize that part of the age-dividend in autonomy is rooted in beliefs regarding the supernatural powers of menopausal women. To test this hypothesis, we study the age-dividend in four West-African countries that include ethnic groups that practise(d) voodoo. Our empirical analysis relies on several rounds of DHS surveys, and a difference-in-differences strategy, in which we exploit the quasi-exogenous variation in the timing of menopause as well as the historical variation in magicoreligious beliefs across ethnicities. We find that (1) the age-dividend in women's autonomy is more pronounced in ethnic groups that practice(d) voodoo, (2) the menopause-dividend is only observed among women from these groups, and (3) it is especially large for women whose husbands believe that illness can have a supernatural cause. We also document a tangible welfare effect, in terms of a higher Body Mass Index among menopausal women of voodoo-related ethnic groups.

Keywords : Magicoreligious beliefs, gender norms, menopause, women's autonomy.

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## 1. Introduction

After decades of advocacy, empowering women is now firmly established as the fifth Sustainable Development Goal “Achieve gender equality and empower all women and girls”.<sup>4</sup> Underlying this aim is the recognition not only of the intrinsic value of gender equality, but also of its instrumental value. The ‘business case’ for women empowerment mainly builds on evidences of its positive impact on the uptake of family planning programs (e.g. Ashraf et al., 2014), children’s health and nutrition (e.g. Duflo, 2003), and increased efficiency in household production (e.g. Goldstein and Udry, 2008). However, in a review of the literature, Duflo (2012) concludes that empowering women is not the miracle economic development solution. For one, women’s preferences do not always align (more than men’s) with development goals. Second, in the face of sticky social norms, a one-shot intervention to boost one aspect of women’s empowerment may have no favorable effect on economic development. A telling example is provided by Field et al. (2010), who find that the positive impact of a business training for women in India did not extent to Muslim women, because their restricted mobility prevented them from putting their knowledge to use.

This example illustrates what motivates this paper: designing effective female empowerment policies requires a thorough understanding of cultural norms, and how they apply differently to different women in society. In this paper, we focus on the variation of gender norms across age and ethnic groups in four West-African countries, and hypothesize that such variation is rooted in magicoreligious<sup>5</sup> beliefs about the power of elderly women. More specifically, we hypothesize that this variation relates to the voodoo belief that menopausal women, so-called *tassinons*, can interact with the invisible world and derive supernatural power from this interaction. These alleged powers, in their turn, increase the bargaining power of elderly women in their communities and households. Alternatively, it could be that the belief in the supernatural power of

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<sup>4</sup> <http://www.un.org/sustainabledevelopment/gender-equality/>, last consulted: 2 June 2017.

<sup>5</sup> Throughout the paper, we use the terms ‘supernatural’ and ‘magicoreligious’. While supernatural beliefs refer to beliefs in anything beyond the visible observable universe, including the belief in God or gods, magicoreligious beliefs are more specific as they refer to magical practices intended to cause a supernatural being to produce or prevent a specific result (such as illness).

menopausal women has faded, but the cultural norm derived from it, i.e. increased awe for elderly women, persists.

To test our hypothesis, we rely on 14 Demographic and Health Survey (DHS) rounds from Nigeria, Togo, Ghana and Benin - which belong to the Gulf of Guinea that is home to four ethnic groups which practice(d) voodoo. Our outcome variable is women's autonomy in decision-making, defined for about 19,500 women aged 15 to 49. We start from the observation that such autonomy increases with age, and that this age-dividend is stronger for women belonging to the four 'voodoo-ethnicities'. Then, we provide evidence for a menopause-dividend, that exists – on top of the age-dividend – only among women of voodoo-ethnicities, as well as a higher BMI for these women. Since menopause is an exogenous event, outside the control of the individual, this result indicates that the associated gain in autonomy and BMI is caused by 'something' that has to do with menstrual bleeding and is particular for voodoo-ethnicities. In support of the proposed '*tassinon*-mechanism', we show that the menopause-dividend is especially strong for women whose husbands believe in the intimate relation between the visible and invisible world and human agency herein, proxied by the self-reported belief that HIV-AIDS can be transmitted by witchcraft. To provide flesh to the bones, we complement our quantitative analysis with narratives from traditional leaders, voodoo priests and menopausal women, obtained through qualitative fieldwork in Benin.

In terms of contribution, we are – to the best of our knowledge – the first to specifically address the cross-cultural variation of the age-dividend in women's autonomy, and the first to quantitatively relate women's autonomy to cultural attitudes rooted in magicoreligious beliefs. While both voodoo and menopause are somewhat 'exotic' to the field of economics, our work constitutes a contribution to at least three strands of economic literature: (1) the individual-level determinants of female autonomy, (2) the (historical) origins of cross-cultural differences in gender norms, and (3) the economics of magicoreligious beliefs. In addition, we speak to two important fields outside economics: (4) the feminist literature on complex identities of African women, and

(5) the anthropology of menstruation. What we add transversally to these different strands is a specific focus on elderly women in Sub-Saharan Africa (SSA). This is a timely focus; as fertility declines and life expectancy increases, elderly women are making up an increasing share of the SSA population.

The next section briefly outlines the key aspects of these five strands of literature. In section 3, we provide background to the pre-colonial magicoreligious beliefs that prevail(ed) in the Gulf of Guinea. In sections 4 and 5, we present our empirical framework and data, before discussing results in section 6. Section 7 explores the underlying mechanisms driving our results and Section 8 concludes.

## 2. Literature

A large number of country case studies set out to identify the individual-level determinants of the autonomy of women vis-à-vis their husband (e.g. Anderson and Eswaran 2009, Azra Batool et al. 2017, Darteh et al. 2014, Fuseini and Kalule-Sabiti, 2016). In general, these studies find that age is a positive determinant of women's autonomy. Two cross-country studies confirm this general finding. First, in an analysis of DHS data from 58 countries, representing almost 80 percent of the female population of developing countries, Hanmer and Klugman (2016) find that age is consistently positively related to several measures of women's agency and empowerment. In a second study of pooled DHS surveys from 23 different countries, Kishor and Subaiya (2008) conclude that *"the significant increase in decision-making alone with age is not explained away by any of the control variables, suggesting that aging directly and positively influences decision-making alone."* (p.22). Only a handful of studies devote attention to the underlying reasons for the age-dividend. Reviewing a number of such studies, Mason and Smith (2003, p.15) conclude that *"older women are argued to have more independence and empowerment than younger women because they have more experience with life, a better understanding of how to get what they want or need, a closer relationship with the husband, or because they have fulfilled certain social obligations to the husband and his family (for example, bearing children or sons) and thus are*

*more trusted than are young wives, over whom tighter controls are maintained*". Most of these reasons remain speculative, and – to the best of our knowledge – our paper constitutes the first attempt to empirically pin down an explanation for the age-dividend in women's autonomy.

By searching for an explanation in cultural differences across ethnic groups, we follow in the footsteps of a number of scholars who have empirically investigated cross-cultural variation in gender norms. For instance, Alesina et al. (2013) relate differences in present-day gender roles to the form of agriculture practiced in the pre-industrial period; Alesina et al. (2016) uncover the pre-colonial determinants of contemporary violence against women in Africa; while Fenske (2015) and Dalton and Leung (2014) study how polygyny in Africa today relates to colonial institutions and the intensity of the slave trades. Outside SSA, attention has focused among others on how the main monotheistic religions have affected cross-cultural gender norms, through centuries of religious socialization (e.g. Esping-Andersen 1999, Haddad and Esposito 1998). More generally, these studies belong to the strand of literature that highlights the stickiness of cultural norms, and hence the importance of considering such norms when discussing policies aimed at or premised on cultural change. To the best of our knowledge, we present the first quantitative analysis that relates the cross-cultural difference in gender norms to pre-colonial magicoreligious beliefs in Africa.

By doing so, we contribute to the small but growing economic literature that studies the impact of magicoreligious beliefs in SSA on social behavior, human well-being and development outcomes. Gershman (2016), for instance, demonstrates that witchcraft beliefs are correlated with mistrust, which may impede development; Platteau (2014) argues that the threat of witchcraft accusations discourages the accumulation of private wealth and entrepreneurship; Stoop et al. (2017) estimate a negative impact of voodoo-adherence on the uptake of biomedical preventive health care; Alonso Briones et al. (2016) study the role of voodoo in the management of the commons; Nunn and Sanchez de la Sierra (2017) demonstrate that magicoreligious beliefs in the armed conflicts in eastern Congo help organizing community defense; and LeMay-Boucher et al. (2013) document large expenditures on magicoreligious protection by households in Benin. These

studies demonstrate that magicoreligious beliefs play an important role in various domains of development in SSA. We are the first to explicitly link magicoreligious beliefs to intra-household bargaining power of women, in particular elderly women.

While innumerable studies have looked at women of reproductive age, very little attention has gone to elderly women in SSA. Exceptions include Duflo (2003) and Edmonds (2006) who study the impact of pension schemes in South-Africa. On a completely different note, a well-known study by Miguel (2005) shows how, in Tanzania, especially elderly women fall victim to witchcraft accusations and killings in times of sharp income shocks – caused by drought or flood. Like Miguel, we study the impact of magicoreligious beliefs on elderly women in SSA. But, whereas Miguel shows that – in times of great distress, in Tanzania – elderly women are the victim of their alleged supernatural powers, we argue that – in normal times, in the Gulf of Guinea - these powers provide them with agency.<sup>6</sup>

Studying age in tandem with gender responds to a concern of the African feminist literature, that has long argued that the Western gender concept is alien to Africa. Instead, in most African societies, seniority is the key dimension of identity and status. When describing the Yoruba society in Southwestern Nigeria, Oyêwùmí (1997) argues that “*the fundamental organizing principle within the family is seniority based on relative age, and not gender*”. Thus, the person with the most seniority, regardless of gender, will assume the position of authority; and a woman’s status in the extended family increases over time, as her age advances in relation to those around her. In addition, whereas the Western notion of man and woman is binary and inherent in nature, the African notion is fluid and highly situational and does not depend on body type, as aptly demonstrated in Amaduime’s “*male daughters, female husbands*” (1987). Menopause can pose such a situational factor that disrupts the dichotomy of the man/woman categories. For instance, in her ethnographic study of the Beti

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<sup>6</sup> Essentially, our results and those of Miguel (2005) are two sides of the same coin. On the other hand, the power of the menopausal woman specifically relates to the familial deities and not to collective deities. Hence, it is unlikely that major rainfall shocks, which are prescribed to collective deities, will be blamed on tassinons.

society in South-Cameroun, Vincent (2003) argues that *“the menopause marks the access to a higher status : the menopausal woman is liberated from the submission to the man. She has become his equal ; she is ‘like a man’, as many informants put it”*.<sup>7</sup> Our study explores the intersectionality of gender, age and menopause, thus providing a quantitative test for the critique of a one-size-fits-all approach to gender in an African context.

Another non-economic strand of related literature is concerned with the relation between magicoreligious beliefs and the agency of women. Regarding this relation, Igreja et al. (2008) describe the widespread prevalence of *gamba* spirits in post-war Mozambique. These are spirits of male casualties of the war that take possession of women’s bodies and, by doing so, not only help process memories of the war but also improve the status of women who greatly suffer(ed) in the war and post-war context (p. 364-365) *“Contrary to everyday conjugal unions, in which the wife is expected to subordinate herself to the husband, in this case the husband must subordinate himself, via the spirit, to his wife... In this society, people who accommodate spirits are entitled to respect and power”*. Also in various other African cultures, women possessed by spirits command respect, thus turning the usually assumed male-female dichotomy upside down (Lewis 2003; Masquelier 2001). As we will further explain in the next section, menopausal women in voodoo-cultures are not thought to be possessed by a spirit, but are thought to be able to communicate with spirits, and therefore to harbor powers that command both fear and respect.

A final strand of related ethnographic literature is the rather extensive body of studies on the ‘anthropology of menstruation’. In ‘Blood magic’, an edited volume on the topic, Buckley and Gottlieb (1988) start by acknowledging that *“the topic of menstruation has long been a staple of anthropology, for this apparently ordinary biological event has been subject to extraordinary symbolic elaboration in a wide variety of cultures.”* Anthropologists have especially focused on rites of passage - menarche rituals in the

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<sup>7</sup> Authors’ translation from French: “ l’arrêt des règles marque l’accès à un statut supérieur : la femme ménopausée est libérée de la soumission à l’homme. Elle est devenue son égale ; elle est « comme un homme », disent beaucoup d’informatrices ».

case of girls, as well as on menstrual taboos.<sup>8</sup> The menopause has received much less attention, although there are a few noteworthy exceptions, such as Héritier-Augé (1998)'s "Anthropologie de la ménopause", and the above-mentioned study by Vincent (2003) of the Beti society in South-Cameroun. This literature goes against the popular (Western) view of menstrual taboos as a sign of oppression and lower status of women (for such stereotyping see e.g. Weideger's 'Menstruation and Menopause', 1976). Instead, several ethnographers point to the benefits of those taboos for women, as well as the spiritual nature of the taboos, which suggest that they are part of wider religious systems with cosmological ramifications (e.g. Buckley and Gottlieb, 1988). With respect to this religious character, note that menstrual taboos are found both in Islam and Christianity.<sup>9</sup> While our paper is not directly concerned with menstrual taboos, we need to take note of such taboos, as they may provide a competing explanation for our findings. Indeed, it may be the lifting of such taboos that explains the increase in autonomy of menopausal women, rather than the actual positive effect of entering into menopause.

We will address this concern in the empirical analysis. Now we turn to a background section on the role and status of menopausal women in voodoo cultures, both as described in the literature and as revealed during qualitative interviews in Benin.

### 3. Background and hypotheses

African traditional religions are characterized by a continuum between the visible and invisible world. The invisible world includes the supreme being (God), but also lesser entities such as

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<sup>8</sup> Stephens (1961) classified the menstrual taboos in five categories: those against menstrual blood as itself dangerous; those that require the isolation of menstruating women; those that prohibit menstrual sex; those that prohibit menstruating women's cooking; and a broad category of "other" taboos.

<sup>9</sup> The Greek Orthodox Church upholds the taboo against menstruating women receiving Communion, while this taboo was abolished in the Roman Catholic in the year 597 (Wood 1981: 713-714, cited in Buckley and Gottlieb, 1988, p. 258). In Islam, Verse 222 of Sourate Al-Baqarah states the following about menstruation: "*It is a state of impurity; so keep away from women in the state of menstruation, and do not approach them until they are cleansed. And when they are cleansed, then come to them as Allah has commanded you. Truly, Allah loves those who abstain from evil and keep themselves pure*". According to the Sunnah (the portion of Muslim law, based on the words and acts of prophet Muhammad, and preserved in the traditional literature) menstruating women should not pray (Sahih Al-Bukhari 333, Book 6, Hadith 37) should not perform the Tawaf around the Ka'bah during the Hajj (Sahih Al-Bukhari 305, Book 6, Hadith 10) and should not fast during Ramadan (Sahih Al-Bukhari 304, Book 6, Hadith 9).



divinities, ancestors and spirits, who are believed to possess powers that can influence earthly life. These powers can be used by the spirits and ancestors themselves, but they can also be exploited by humans through sacred rituals, or witchcraft (Geschiere, 2013).

Voodoo is the name of a relatively widespread and well-documented African traditional religion, that still remains vibrant today. The word Voodoo, also 'Vodun', stands for 'spirit', 'god' or 'deity'. Its etymology relates to the Ewe word *vo*, translated as hole or opening, and to the Yoruba term *du* or *odu* used to designate divination signs (Gilli, 1976, cited in Norman 2009). This word combination illustrates that voodoo originates from the meeting of the traditional Yoruba cult and the deities of the *Fon* and *Ewe* ethnic groups (Delanne et al., 2010). This meeting occurred during the creation of the Dahomey kingdom in the 17<sup>th</sup> century, in present-day Benin. Whenever the kings of Dahomey conquered land, they adopted its deities and religious chiefs (Bay, 1998; Soumonni, 2012).<sup>10</sup> As a result, voodoo evolved into a 'new' supra-clan religion and spread in tandem with the kingdom's expansion. In particular, during the incumbency of king Agadja (1708-1740), voodoo expanded eastward up to the Oyo kingdom in Nigeria, and westward up to Ghana's Ashanti kingdom. Today, voodoo is practiced along the Gulf of Guinea in the coastal areas of Benin, Togo, Ghana, Nigeria and to some extent in Côte d'Ivoire (Lando, 2013). Macé (2005) labels the coastal area spanning eastern Ghana, Togo, Benin and western Nigeria as 'voodoo land'. The groups with historical homelands in this area include the Fon, Ewe, Adja and Yoruba, as well as smaller related groups, incl. the Gun, Toli, Ayizo, Xweda, Xwla, Popo, Waci and Gen (Delanne et al, 2010; Médiouhouan, 1993).

Voodoo deities can be grouped in two main categories: *tovodun* that are collective deities and *hennu vodun* that are familial deities (Horton, 1983). *Tovodun* relate to different natural elements, such as the sea, the earth, or thunder. *Hennu vodun* are deified ancestors. After death, they turn into spirits who interact with the family or the clan. They are symbolised by "*the asen, which are moveable*

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<sup>10</sup> Bay (1998: 22) notes that: "*Dahomeans were always on the alert for deities of proven capability. A vodun that worked well for another community would be welcomed. Immigrants, including war captives, often carried their vodun with them and installed them in Dahomey. Dahomeans were sometimes sent to neighboring areas to be trained as priests of new gods. Vodun even arrived as spoils of war*".

metal objects able to hold or affix spiritual entities.” (Bay, 2008, p.1). Each family keeps its ancestral *asen* representing its *bennu vodun* in a sacred space, called *debo*. Every individual member of a family is supposed to visit the *debo* at least once annually during a ceremony called *de hibo nu asen* which is led by a menopausal woman, referred to as the *tassinon*, literally meaning ‘elderly paternal aunt’.<sup>11</sup> During *de hibo nu asen*, only she can transmit the prayers and vows (*de hibo*) of the family members to the ancestors and consult the oracle to see if the spirits have accepted the offering and sacrifices (fowl and sheep). Furthermore, on a daily basis, the *tassinon* venerates the family ancestors through special prayers and incantations (Adohouannon, 2015). Each family has its own *tassinon*. She is chosen, among the family’s menopausal women, by the oracle (*Fâ*), a complex divination system based on 256 figures and thousands of verses, which are memorized and interpreted by a diviner.

<sup>12</sup> For the specific case of the *tassinon* choice, the presence of all important family members and other dignitaries of the locality is required to witness the sign revealed by the *Fâ* and cross-check its interpretation.<sup>13</sup>

To complement the thin literature on *tassinon*, the first author of this paper undertook qualitative fieldwork in 17 different localities in six distinct zones of Benin, which are all part of ‘voodoo land’.<sup>14</sup> The fieldwork consisted of semi-structured interviews with 103 informants. In

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<sup>11</sup> The name ‘*tassinon*’ is used in Fon, Adja and Ewe languages (Benin, Togo and Ghana), *Tangninon* is used in Goun (Benin) and *Iya Alatche* in Yoruba language (Nigeria and south-eastern Benin).

<sup>12</sup> *Fâ* (or *Ifa* in Yoruba) is the most widespread system of divination in the Gulf of Guinea and among descendants of African slaves (Bascom 1991). The oracle transmits the messages of Mawu (the supreme being in voodoo) through 256 figures that are obtained either by manipulating sixteen palm nuts or by the toss of a chain of eight half seed shells. They are then interpreted based on thousands of memorized verses. Whenever one of the 256 figures manifests itself, the associated verses are cited by the diviner (Bascom, 1941; Mediohouan, 1993). The revealed figures are given to the client on a piece of paper or calabash which allows double-checking the interpretation (Tall, 1990). The rigid set of rules for interpretation, and the possibility to cross-check, reduce the scope for manipulation or subjectivity (Bascom, 1991; Tall, 1990). The message transmitted through *Fâ* is not up for dispute because it “derives from the gods and is controlled by the gods”, and therefore “Ifa divination shares the sanctity of the gods, and is reinforced by the sanctions which lie behind the faith directed toward religion in general.” (Bascom, 1941, p. 44).

<sup>13</sup> All other extended family members may also witness the ceremony or otherwise ask for the revealed sign afterwards (narratives from our qualitative fieldwork). In exceptional cases the oracle chooses a non-menopausal woman (for instance when there is no menopausal woman in the extended family). In that case, it is strictly forbidden for the *tassinon* to perform the rituals during her menstrual period.

<sup>14</sup> The localities were chosen based on the principle of attaining maximum variation across the urban-rural divide as well as across the four main ethnic groups that (historically) practice(d) voodoo. The first zone included Abomey, which is the capital of the former Dahomey kingdom, as well as two close rural localities, i.e. Cove and Zagnanando. Abomey as well as the surrounding area is dominated by Fon. The second zone was made up of Benin’s main city, Cotonou, and the neighboring urban area of Abomey-Calavi. The third zone consisted of the historic slave port city Ouidah, where the voodoo cult is considered especially vibrant, and parts of its rural commune Kpomasse. The fourth zone included the capital city Porto-Novo, and proximate rural sites Avrankou and Dangbo in the South-East of the country. The fifth zone covered the South-West, including Lokossa, Se, Athieme, Dogbo, which are home to the Adja and Ewe ethnicities. Finally, Ketou, Sakete and Pobe were included as the historic homelands of the Yoruba in Benin.

selecting the respondents, the purpose was to learn about the tassinons institution. Therefore, the sampling was not random, but purposefully targeted to chiefs and kings of the localities, to voodoo priests of the main voodoo convents, and to tassinons, who were contacted through the convents and subsequently by snowball sampling. In the end, semi-structured interviews were conducted with 62 traditional leaders and voodoo priests (males, indicated below by M), 39 tassinons (indicated by T), and two professors at the Faculty of Sociology of the University of Abomey Calavi (Benin), both specialized in gender in Benin (indicated by P).

First of all, the interviews make clear that each extended family that keeps contact with its own *hennu vodun*, has a tassinon designated by the *Fâ*. In performing the rituals, the tassinon can be assisted by other women of the extended family. These women are almost always menopausal but they are not chosen by the *Fâ*, and have a less important role: « *Some families have many menopausal women to assist the tassinon in her duties but only the tassinon (the one chosen by the Fâ) serves as intermediary with the asen. [T6 : GD-Abomey-Tassinon] ; [M55 : DF-Ouidab-Dignitary]* ». The assistants may replace the tassinon in case of her absence or sickness. In this specific condition, their words and prayers are also sacred but remain less powerful compared to those of the tassinon: « *... Prayers and worships of the assistants may or may not come true. They do not bear the same sacrality as those of the tassinon chosen by the Fâ... [T29 : AH-Avrankou-Tassinon]* », « *... The assistants have less supernatural power than the tassinon but they also know medicinal plants and can heal people. [M72 : KH-Calavi-Vodunon]*».

The interviews confirm that the tassinon serves as an intermediary between family members and family ancestors and is believed to have supernatural powers. For instance: « *The tassinon is equipped with supernatural powers. Only she can talk to the ancestors and request their help, assistance and protection. And they respond to her worship and requests, not everyone can do that... [M8: MG-Abomey-Dah]*». The respondents also stress the impact of the Tagninon on (mis)fortune in the family (e.g. infertility, illness) : « *Since ages, the tassinon has the power that her prayers are realized... [T25 : HA-Porto Novo-Tassinon]* », « *The tassinon requests assistance of the asen or the hennu vodun to solve people problems. [T45 : AI-Kétou-Présidente Fétiches]* », « *... we can heal sick persons with our prayers and supernatural powers. We*

*just have to ask the asen or the vodun. [T34 : #- Sakété-Tassinon]*». Because of her powers, the dominant feelings of people vis-a-vis the tassinon (and her assistants) are fear and respect: «*People fear the tassinon [M5: DO-Abomey-Vignan]*», «*Family members experiencing a hard time, misfortune or successive troubles often attribute it to the tassinon and to her assistants [T68 : LW-Dangbo-Tassinon]*», «*The tassinon might also use her supernatural powers to send witchcraft to people and harm their life. A very easy way is to give a forbidden meal or drink to the hennu vodun on behalf of the one she intends to harm.*» (Adobouannon, 2015), «*The deference shown to the tassinon stems from her intermediary role and from the fact that whatever she requests to the asen will come true. [T17 : MS-Zangnanado-Tassinon]*»

It is also stressed that tassinons enjoy a high status : «*Tassinon is the most important position that a woman can get in the extended family and in voodoo. No position is higher than that of tassinon because she is the one taking care of the ancestors; and the vodun protecting the family belong to the ancestors. [M4 : DG-Abomey-Dah]*», «*The tassinon is as important as the Dah [chief of the extended family, a male]. The only difference is that she is female. [T25 : HA-Porto Novo-Tassinon]*». In this status, the tassinon is involved in all main social events, not only in her family, but also in the wider community: «*... She is consulted by traditional leaders and dignitaries for all important matters or decisions affecting the village or the community life [M1 : AH-Abomey-Dignitaire]*», «*The tassinon is at the core of all social ceremonies, for example for the introduction of newborns to the extended family. She also serves as marriage counselor for all couples of the extended family [M28 : AG-Avrankou-Dignitaire]*». According to the interviewees, the tassinon status also comes with greater involvement in decision making and autonomy at the household, extended family and community level. Particular attention is paid to the tassinon requests, wishes and recommendations : «*The tassinon's judgement or opinion is final. Nobody, even the Dah (head of the family, head of village, king) can challenge it (Delanne et al, 2011)* », «*... My opinion matters now in all important decisions or issues in the family and in my community. It was not the case before my designation by the Fâ as tassinon. I could not even attend or talk in certain audiences [T6 : GD-Abomey-Tassinon] ; [T9 : AG-Abomey-Tassinon]* ».

At the personal level, the enhanced social status is a source of pride and self-esteem. «*... The importance and the consideration that the family and the community give me as tangninon is a source of pride*

and joy. [T9 : AG-Abomey-Tassinon] », but the increased status comes with strings attached. The tangninon must be available to people and the worship to the *asen* can be time consuming: « ... *In case of emergency or particular situations in the extended family, I have to give up my activities to fulfill my duties as tangninon* [T16 : AL-Zangnanado-Tangninon] ».

In sum, our interviews reveal that the tassinson is believed to have supernatural powers that can influence her family members' destiny in one way or another; the tassinson is feared and enjoys respect; the status comes with several privileges, social importance and is a source of pride, self-esteem and self-fulfillment; it is said to come with greater involvement in decision making and autonomy both at household, extended family and community levels. This greater involvement is likely to be a blessing, but could also be a curse as it may require an important time investment. Although the power and associated status is concentrated in the tassinson, other menopausal women may enjoy spill-over effects, for at least four reasons: (1) As assistants of the tassinson, they are in close communication with her and can therefore influence her actions; (2) the assistants may replace the tassinson in case of her absence or sickness; (3) each menopausal woman has a chance to be chosen by the Fâ as the successor of the tassinson, should the latter pass away; and – more indirectly – (4) the tassinson institution may have translated into a cultural norm that commands respect for menopausal women in general.

Informed by the literature and our qualitative findings, we hypothesize that women of voodoo ethnicities gain autonomy when they get older, and in particular when they enter menopause. In addition, we hypothesize that their enhanced status increases their welfare, proxied by their Body Mass Index (see below). As regards the underlying mechanisms, we propose three possible mechanisms: (1) there could be a general cultural norm at play commanding awe for elderly and menopausal women, or (2) the menopause-dividend could be due to a more narrow tassinson-effect rooted in the actual fear for the supernatural powers of the (future) tassinson and her assistants, or (3) it could be the case that the tassinson-effect passes through an income channel, with the (future) tassinson and her assistants deriving a higher income from ceremonial functions

and the associated larger social capital, which in its turn provides them with more intra-household bargaining power. We will tentatively test for the latter two channels in Section 7.

#### 4. Empirical strategy

Our empirical strategy is based on a Difference-in-Differences (DiD) approach, in which we consider how women's autonomy varies across age and menopause-status, and how this variation differs by ethnic group. We proceed gradually, by means of five estimating equations.

To start with, we estimate the simple age-dividend in women's autonomy using the following equation :

$$\begin{aligned}
 \text{(Eq.1) } \textit{Autonomy}_{hwm} &= \alpha_0 + \alpha_1 \textit{Woman age}_w + \alpha_2 X_{hw} + \alpha_3 X_{hm} + \alpha_4 X_c \\
 &+ \alpha_5 X_h + \Delta \textit{Region}_h + \nabla \textit{DHS}_{\textit{year}} + \varepsilon_{hwm}
 \end{aligned}$$

where  $h$  indicates household,  $m$  the husband and  $w$  the individual woman.  $\textit{Woman age}_w$  is our independent variable of interest;  $\textit{Autonomy}_{hwm}$  is the autonomy index, that we further explain in the data section below;  $X_{hw}$  is a vector of woman-level characteristics that includes her years of schooling, her height and an indicator variable for her religion;  $X_{hm}$  is the set of husband-level characteristics comprising his years of schooling and an indicator variable for whether he lives together with the woman;  $X_c$  stands for the age difference between the man and woman in the couple, while  $X_h$  includes the household's residence area (urban/rural), and wealth quintile.<sup>15</sup> We also control for the administrative region<sup>16</sup> of residence of the household ( $\textit{Region}_h$ ) and for the year in which the DHS survey took place ( $\textit{DHS}_{\textit{year}}$ ) to capture time trends across consecutive survey rounds.

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<sup>15</sup> For each survey round, interviewed households are divided into five wealth quintiles based on their wealth index. The wealth index is calculated using principal components analysis on easy-to-collect data on a household's ownership of selected assets, such as televisions and bicycles; materials used for housing construction; and types of water access and sanitation facilities (Standard Recode Manual for DHS 6, 2013).

<sup>16</sup> The region of residence is country specific and generated as follows: (country code x 1000) + region code in the country. The insertion of region fixed effects makes country fixed effects superfluous.

Second, we turn to a first DiD equation to investigate whether there is cross-cultural heterogeneity in the effect of age on women's autonomy: :

$$(Eq. 2) \text{ Autonomy}_{hwm} = \beta_0 + \beta_1 \text{ Woman age}_w + \beta_2 \text{ Voodoo ethnicity}_w + \beta_3 \text{ Woman age}_w * \text{ Voodoo ethnicity}_w + \beta_4 X_{hw} + \beta_5 X_{hm} + \beta_6 X_c + \beta_7 X_h + \Delta \text{Region}_h + \nabla \text{DHS}_{\text{year}} + \varepsilon_{hwm}$$

In this equation, the estimated coefficient  $\beta_3$  on the interaction term indicates whether the age-dividend is different for women of voodoo-related ethnicities. The binary variable *Voodoo ethnicity<sub>w</sub>* absorbs the cross-cultural difference in the level of autonomy averaged across all ages.

Third, we estimate the effect of menopause on women's autonomy, by means of the following equation:

$$(Eq. 3) \text{ Autonomy}_{hwm} = \gamma_0 + \gamma_1 \text{ Woman age}_w + \gamma_2 \text{ Menopause}_w + \gamma_3 X_{hw} + \gamma_4 X_{hm} + \gamma_5 X_c + \gamma_6 X_h + \Delta \text{Region}_h + \nabla \text{DHS}_{\text{year}} + \mu_{hwm}$$

*Menopause* is a dummy variable taking the value 1 if the woman is menopausal<sup>17</sup> and 0 otherwise. Menopause is a quasi-exogenous event. It only weakly relates to a woman's behaviour, and in spheres that are unlikely to matter in the African context, such as hormonal treatment and smoking (Bromberger et al., 1997; Meschia et al. 2000). We will further demonstrate this in the results section, by regressing menopause on a set of women characteristics.

Fourth, we turn again to a DiD specification, examining the coefficient on the interaction term between menopause and the dummy variable capturing whether the woman belongs to a voodoo related ethnic group. Concretely, the specification takes the following form:

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<sup>17</sup> The dummy variable for menopause is derived from the DHS variable v215 (time since last menstrual period). The response options include the number of days/weeks/months since her last menstrual period and whether a woman is menopausal. To account for potential measurement error in the answer category 'menopause', we extend the group of menopausal women to women over 40 with no menstrual period since at least one year at the time of the survey. Our results remain the same.

(Eq. 4)  $Autonomy_{hwm}$

$$\begin{aligned} &= \delta_0 + \delta_1 Menopause_w + \delta_2 Voodoo\ ethnicity_w + \delta_3 Menopause * Voodoo\ ethnicity_w \\ &+ \delta_4 Woman\ age_w + \delta_5 X_{hw} + \delta_6 X_{hm} + \delta_7 X_c + \delta_8 X_h + \Delta Region_h + \nabla DHS_{year} + \vartheta_{hwm} \end{aligned}$$

$\delta_3$  captures the additional menopause-dividend in voodoo-cultures, which we argue to stem from the tassinon institution, and consequently refer to it as the ‘tassinon-effect’.

Finally, we add the interaction term  $Woman\ age_w * Woman\ is\ voodoo\ related_w$  to Eq.4 in order to isolate the menopause-dividend and its additional voodoo-effect (or ‘tassinon-dividend’) from the more general age-dividend and its additional voodoo-effect. This gives the following:

(Eq. 5)  $Autonomy_{hwm}$

$$\begin{aligned} &= \sigma_0 + \sigma_1 Menopause_w + \sigma_2 Woman\ is\ voodoo\ related_w \\ &+ \sigma_3 Menopause * Woman\ is\ voodoo\ related_w + \sigma_4 Woman\ age_w \\ &+ \sigma_5 Woman\ age_w * Woman\ is\ voodoo\ related_w + \sigma_6 X_{hw} + \sigma_7 X_{hm} + \sigma_8 X_c + \sigma_9 X_h \\ &+ \Delta Region_h + \nabla DHS_{year} + \tau_{hwm} \end{aligned}$$

$\varepsilon_{hwm}$ ,  $\mu_{hwm}$ ,  $\vartheta_{hwm}$  and  $\tau_{hwm}$  are error terms.

To verify whether the increases status, and associated autonomy, is welfare-enhancing rather than posing an additional burden on women’s time use, we replace  $Autonomy_{hwm}$  with a woman’s Body Mass Index. We estimate the equations using linear least squares. In all cases, we use heteroscedasticity-robust statistics and cluster error terms at the household level to account for within-household correlation of the residuals.

Our identifying assumption in Eq. 2, 4 and 5 is that, in the absence of the tassinon belief, the age- and menopause-dividend would be similar across voodoo and non-voodoo ethnicities. Any competing explanation should not merely have a level effect on female autonomy, but an effect that varies with age or menopause (Nizalova & Murtazashvili, 2016). Thus we need to be alert for characteristics of voodoo-related ethnic groups, besides the tassinon institution, of which the effect is triggered by menopause. One potential competing explanation could be that our menopause-dividend picks up the lifting of menstrual taboos, that may constrain activities of



younger women. We will counter this concern in the data section below, by showing that even younger women of voodoo-ethnicities enjoy more autonomy than their counterparts in non-voodoo ethnicities, making it less likely that their autonomy is crushed by disproportionately strict menstrual taboos. Furthermore, while an exploration of the topic of menstrual taboos in our qualitative field work did reveal the existence of such taboos, there is no indication from our own field research neither from the ethnographic literature, that such taboos are more prominent among voodoo ethnicities than among the other ethnic groups. While there are differences between voodoo- and non-voodoo related ethnicities, in terms of geographic location and social organization, it is hard to imagine how such differences could give way to a menopause-dividend. We will in any case compare the characteristics of voodoo and non-voodoo related ethnicities and test for possible competing explanations, by adding interaction terms between these characteristics and menopause.

## **5. Data**

Our database is a compilation of 14 DHS rounds collected throughout the period 1993-2014 in Benin (4 rounds), Nigeria (3 rounds), Togo (2 rounds) and Ghana (5 rounds). It encompasses information on 19,471 couples for which all variables of our econometric specification are available. Women in these couples are aged 15 to 49. The ethnic groups historically practicing voodoo - the Fon, Ewe, Adja and Yoruba - represent 32.8% of women in our analytical sample.

The DHS includes four questions on women's autonomy in decision making, which relate to the following areas: (1) the use of her own earnings, (2) her own health care, (3) visits to family or relatives, and (4) major household purchases. Each question had six response options regarding decision-making: respondent alone, respondent and husband/partner, respondent and other person, husband/partner alone, someone else, and others. For each area of decision-making, we created a binary variable that takes the value 1 for the first three responses that indicate the woman's

(full or partial) involvement in decision-making, and 0 for the other response options. We then use principal component analysis to construct an *index* of the four binary variables.

Table 1 provides summary statistics for our analytical sample: the average, the standard deviation, and the comparison in mean between voodoo related and non-voodoo related ethnicities. On average, women are 31.34 years old, have given birth 4 times and completed 4.14 years of schooling. 2.53% of them are menopausal and 1.23% are both menopausal and voodoo related. Women from voodoo-ethnicities are on average more involved in decision making regarding the use of their earnings, health care sought, family visits and large purchases than other women. Their autonomy index stands at 0.44, compared to only 0.21 for women of non-voodoo ethnicities. They have a larger BMI (23.96 vs 23.27) and are more likely to engage in ‘modern’ activities (defined as professional/technical/managerial and clerical activities) than non-voodoo related women (6.39% versus 5.02%). A large proportion of women in our sample self-reports being Christian (49.62%), or Muslim (36.85%), while 14.89% of women from voodoo-related ethnicities reports adhering to ‘traditional religion’, compared to only 4.05% of non-voodoo related ethnicities. There is however considerable religious syncretism, which remains unobserved in the DHS data. Self-reported Christians or Muslims may at the same time adhere to voodoo customs, and several African Independent Churches are blending Christian traditions with voodoo-like rituals, miracles and charismatic healing (Barbier and Dorier-Apprill, 2002; Tall, 1995).

The ‘autonomy index’ is plotted against age in Panel A of Figure 2. The dotted line shows the relationship for non-voodoo women, while the solid line is confined to women of voodoo-related ethnicities. Both lines reveal that on average women gain autonomy with age, but the gain is larger for women of voodoo-related ethnicities. The patterns also clearly show that, even at young ages, women of voodoo-ethnicities have much higher autonomy than other women. Hence, it is unlikely that stronger menstrual taboos in voodoo-cultures account for the additional menopause-dividend. The bar chart in Panel B of Figure 2 compares the autonomy index across menopausal

women and non-menopausal women, and across voodoo and non-voodoo ethnicities. It shows that the menopause-dividend is particularly important for women from voodoo related ethnicities.

Finally, we provide a comparison of historical characteristics across voodoo and non-voodoo-related ethnic groups, that we will later pick up when discussing competing explanations for our result. The comparison is based on pre-industrial ethnographic data provided by Murdock (1967). Table 2 gives an overview of the matching between DHS and Murdock ethnicities<sup>18</sup>, and Figure 1 gives the historic location of the 14 Murdock ethnicities. Table 3 shows the results of the comparison, across the voodoo- and non-voodoo ethnicities. The patrilineal descent system dominates both in voodoo related ethnicities and non-voodoo related ethnicities, and none of the ethnicities is purely matrilineal. In both cases, polygamy and extended families were the usual form of domestic organization. Voodoo related ethnicities were more likely to belong to formed states than the non-voodoo related ethnicities, which is consistent with the fact that the Fon, Adja and Ewe were historically part of the vast Dahomey kingdom and the Yoruba founded the Oyo empire. This also had its effect on jurisdiction. While voodoo-related ethnicities had two to three levels of jurisdiction beyond the local community (village) level, there was no or just one level for more than half of non-voodoo ethnicities. Dependence on agriculture was somewhat lower in voodoo related ethnicities, but no single ethnicity relied on animal and plough cultivation. Finally, Table 3 lists the distance to the coastline, which is 230 km shorter on average for voodoo-related ethnic groups, implying they were exposed more to the slave trade than groups located further land inward.

## 6. Results

### *Main results*

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<sup>18</sup> We matched the ethnicities mentioned in the DHS with those named in Murdock's database, relying on the correspondence tables from the Ethnic Power Relations (EPR) database (Wimmer et al. 2009). We could match 21 DHS ethnicities (out of the 28) with 14 ethnicities in Murdock's database. We end up with three instead of four voodoo-ethnicities, because in Murdock's classification, Adja and Fon are grouped together as Fon, while Ewe and Yoruba ethnicities are considered separately.

The estimation results of Eq. 1 indicate that women gain autonomy as they become older (Table 4, Col. I). More precisely, one additional year in age is associated with an increase of 0.017 units of AI. Figure 3 shows the estimated age-dividend across all ages 15-49 in our sample. We note an increasing trend, and find that the age-dividend is estimated consistently positive and significant from 26 onwards. The estimation results of Eq. 2 (Col. II of Table 4) show a significant additional age-dividend of 0.008 for women of voodoo-ethnicities. The estimation of Eq. 3 does not reveal a general menopause dividend (Col. III of Table 4). However, the estimated coefficient on the interaction term between menopause and voodoo-ethnicities in Eq. 4 reveals a ‘tassinon-effect’, indicating that menopause does play a significant role for voodoo-ethnicities (Col. IV of Table 4). The tassinon effect is significant (at 1%) and sizeable, estimated at 0.302, which is equivalent to the effect of an additional 9 years of education for the woman.

The size of this coefficient decreases by 30% when we add the interaction term *Woman age \* Voodoo ethnicity* (see Table 4, Col. V). This suggests that the menopause-dividend in voodoo-cultures as estimated in Eq. 4 is a combination of a more general age-dividend (0.006) and a specific menopause effect (0.220). The first component could be capturing, among others, a gradual transfer of autonomy to women in anticipation of their menopause status. The coefficient estimate of 0.220 on the second component remains sizeable. Its effect is equivalent to the effect of 7 additional years of education for the woman.

Women’s schooling, the household wealth index, urban residence, and the presence of the husband in the house are other significant determinants of women’s involvement in decision making, all entering with the expected sign. Women who enjoyed more years of schooling, who live in wealthier households, or in urban areas, tend to be more involved in household decision making, while the presence of the husband in the household reduces women’s autonomy.

Having documented a differential effect of menopause on women’s autonomy across voodoo and non-voodoo, we now verify whether this *tassinon effect* can be extended to a material welfare outcome, namely the woman’s BMI. Results in Table 5 show that compared to other women (-

1.247), voodoo-related women suffer much less (-0.308) the sharp decline in BMI that comes with the menopause, and this difference is significant at 5%. A competing explanation could be that specific diet in voodoo related ethnicities actually lifts and smoothens reduction in BMI following the menopause. To rule out this possibility, we include the interaction terms *Menopause × Longitude* and *Menopause × Latitude* because it is likely that food habits stems from crops and protein sources available in the homeland of each ethnic group. We get a higher coefficient and still significant at 5% (Col.III of Table 5).

#### *Robustness checks*

We perform six robustness checks. In the first set of checks, we vary the estimation technique and modalities. In particular, regarding the estimation technique, we estimate Eq. 4 as a semi-parametric regression where woman's age enters the regression non-parametrically such that the relationship between these two variables is derived from the data, rather than being imposed as linear. With respect to the modalities, we cluster the standard errors at higher levels than the household level, namely at the DHS cluster and administrative region levels.

In a second set of checks, we add additional control variables. Firstly, we add controls that are potentially endogenous.<sup>19</sup> To the vector of woman-level characteristics  $X_{hw}$ , we add woman's weight, an indicator variable for her occupation, the total number of births<sup>20</sup> given by her and the number of her children who have died. To the set of household level characteristics  $X_h$ , we add the number of the household head's other wives and the number of under-five year old children in the household. Secondly, since countries may provide different institutional environments for older women, e.g. in the form of inheritance or pension laws, we add interaction terms between a woman's age and country fixed effects.

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<sup>19</sup> In doing so, we assume the additional exogeneity conditions described in Lechner (2008, p.6-9).

<sup>20</sup> Results are the same when considering sons and daughters separately.

In a final set of checks, we vary the definition of our variables of interest. With respect to the autonomy index, we use instead of principal component analysis, the simple sum of the separate variables on decision-making.

The results are condensed in Table 6 (and the full results are provided in Appendix 2 to 6). The tassinon effect, i.e. the estimated coefficient on *Menopause \* Woman is voodoo related*, remains stable across all robustness checks, both in Eq. 4 and the more extensive Eq. 5.

### *Competing explanations*

Our identifying assumption underlying the DiD estimation is the parallel trends assumption that in the absence of the tassinon belief the age- and menopause-dividend would be similar across voodoo and non-voodoo ethnicities.

To defend this assumption, we rely first of all on the fact that menopause is outside the control of the individual. Table 7 presents estimates of the determinants of menopause, showing that only age (0.012\*\*\*), age at first marriage (-0.006\*\*\*), and number of births given (-0.14\*\*\*) are predictors of menopause. Age at first marriage most likely captures the effect of age at first menstruation which is positively correlated with the menopause age but goes unrecorded in the DHS. In any case, since women who marry younger tend to have less autonomy, the negative coefficient estimate (-0.006\*\*\*) implies that our estimate of the menopause-dividend in women's autonomy would be an under- rather than overestimation. As regards to negative estimate on the number of births, women this may be a consequence rather than a determinant of the timing of menopause: women entering menopause earlier report a lower number of births.

Secondly, our identifying assumption supposes that, aside from the tassinon institution, there is no other ethnicity-level difference that could explain the menopause-dividend. It is reassuring that we have found no clues in the literature nor in our own qualitative fieldwork for such confounding differences. However, absence of evidence is not evidence of absence. Therefore we check the robustness of our finding by adding a battery of interaction terms between menopause

and certain ethnicity-level characteristic that vary across voodoo-related and non-voodoo-related groups. The characteristics considered are ‘modernization’, ‘polygamy’ and ‘distance to coastline’. Regarding ‘modernization’, it could be argued that, in more modernized ethnic groups, women's achievement in the areas of education and work become important determinants of autonomy, while among groups that remain traditional<sup>21</sup>, factors such as lineage or tassinon status are key factors that shape women's autonomy (Kritz, 1999). To capture ‘modernization’, we add interaction terms between menopause and women's education, and their involvement in modern activities. With respect to polygamy<sup>22</sup>, one could argue that seniority is especially important in such systems, as elderly co-wives usually enjoy a higher status than younger co-wives. Polygamy could thus violate our parallel trends assumption, be it in Eq. 4 and not in Eq. 5 where we control for the interaction between age and ethnic group. Finally, distance to coastline accounts for the fact that, because of their historical location along or near the coastal area in the Gulf of Guinea, voodoo-ethnicities had earlier and longer contact with European cultures than the other ethnic groups in our sample, which may have affected the status of women in some way or another.<sup>23</sup> The results are summarized in Table 8, while the full results are provided in Appendix 7 to 9. We find that the tassinon effect, i.e. the estimated coefficient on *Menopause \* Voodoo ethnicity*, remains stable when adding these interaction terms one by one to Eq. 4. In the case of the more demanding Eq. 5, the tassinon effect loses significance when adding the interaction terms with ‘modernization’ and ‘distance to coastline’.

Thirdly, a different sort of threat to the identifying assumption may stem from sample selection bias. This is because our analysis is based on women in couples, and the probability of

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<sup>21</sup> However, based on differences in women education and their involvement in modern activities, we demonstrated that voodoo-cultures are not per se more ‘traditional’ than the others (see Table 1).

<sup>22</sup> Polygamy is significantly higher in voodoo-related ethnicities, conditional upon controlling for Islam, which dominates in the northern regions of our four countries. This relative high prevalence among voodoo-ethnicities could relate to their historic location near the coastline and thus higher exposure to the Atlantic slave trade, which caused a relative scarcity of men and thus a greater demand for polygamy (Dalton and Leung, 2014).

<sup>23</sup> Distance to the coastal line is computed using latitude and longitude of the centroid of the historical location of each ethnic group, as reported in Murdock's atlas. For Hausa, Peulh, Fulani, Bariba, Dendi and Kanuri/beriberi ethnicities, we looked up the main city of their historical kingdom/chieftaincy from different sources and then used [www.findlatitudeandlongitude.com](http://www.findlatitudeandlongitude.com) to retrieve geographical coordinates.

remaining in couple may depend on characteristics that also affect our outcome variable, and that vary across ethnic groups. If such characteristics would exist, then our results could be driven by a selection effect, i.e. that among voodoo-ethnicities it are the more autonomous women who stay married after menopause, while among non-voodoo ethnicities, these women become single and thus unobserved in our sample. But again, while one can easily come up with characteristics that co-determine autonomy and the probability to divorce (e.g. women's earning opportunities outside the household), it is difficult to imagine confounding factors that are at the same time related to the heterogeneity of the menopause-dividend across ethnicities. Besides, an analysis of divorce rates shows that, while menopause negatively affects the probability of remaining married, there is no cross-cultural difference in divorce rates, not in the full sample nor in the subsample of menopausal women (see Appendix 10).

Finally, there may be a selection issue at the level of ethnic groups, i.e. those groups in which elderly women had more autonomy (for reasons we ignore) may have self-selected into the tassinon institution. Although this alternative explanation is again rather far-fetched, we take it to heart, and instrument the variable *Voodoo related* with the distance to historical capital cities of the Dahomey and the Oyo kingdoms, relying on the historical spread of voodoo and thus the tassinon institution. Of course, this does not completely rule out the alternative explanation, because gender norms could also have spread in tandem with the voodoo institution. But, this concern finds no support in ethnographic literature, unlike the spread of voodoo, which is well documented. If not for countering endogeneity issues, the instrument can be useful to counter attenuation bias. After all, *Voodoo related* is a rather crude binary variable, and the distance to the kingdom's centres may result in a more nuanced variation of the strength of the tassinon institution. The results are reported in Table 9.

*Heterogeneity of the tassinon effect*



We explore the heterogeneity of the tassinon effect with respect to the four dimensions of women's autonomy that we used to construct our index: the use of her earnings, health care seeking, visits to family or relatives, and large household purchases. For each of these four separate areas  $Autonomy_{hwm}$  equals 1 if the woman has some say, and 0 when she does not have a say. A large majority of women in our sample (89.81%) are involved in decision making regarding the use of their earnings, over half (61.62%) have some say in visiting family or relatives, just half are involved in decisions about their health care (50.95%) and a bit less than half have a say about large household purchases (47.57%). Table 10 shows that, while there is a positive tassinon effect for all four dimensions, it is only significant for large household purchases. In this case the effect size is quite large at 0.144 and remains significant in the more extensive Eq. 5, instead of Eq. 4 (see Appendix 11). While the overall effect on AI is mainly driven by this fourth dimension, it is reassuring that we still find a positive and significant tassinon effect on women's autonomy when dropping this fourth dimension from the calculation of the autonomy index (see Appendix 12).

Next, we distinguish between full and partial autonomy in each of the above four dimensions of women autonomy. Full autonomy is an indicator variable that takes 1 if a woman reports deciding alone and 0 otherwise, whereas partial autonomy takes 1 in case the respondent decides with her husband/partner and 0 otherwise. Consistently with the fact that couples in West-Africa have separate budgets, 70.04% of women in our sample have full command over the use of their own earnings, while only 19.77% decide together with husbands on how to use their earnings. However, not many women enjoy full autonomy regarding decisions for care sought for themselves (12.76%), visits to family members (12.00%) and large household purchases (8.77%). Here partial autonomy accounts for larger proportions, at 38.19%, 49.63%, and 38.81%, respectively. Looking at the regression result in Table 11, we find no significant tassinon effect on women's full autonomy (Panel I) while the tassinon effect is positive and significant for women's partial autonomy notably in care sought (0.113), visit to family (0.077) and large purchases (0.157) (Panel II). Therefore, the overall tassinon effect highlighted in Table 4 (Col. IV) stems mostly from partial autonomy.

Finally, we look at the cross-country variation of the tassimon effect. As voodoo originates from Benin, we expect to find a larger tassimon effect in this country. Table 12 reveals that the menopause dividend in voodoo-related ethnicities is positive in all four countries but only significant in Ghana (0.625) and in Benin (0.378).

## 7. Mechanisms

This section tentatively explores the underlying mechanisms of the tassimon effect.<sup>24</sup> In the background section, we documented that tassimons are both feared and respected, and enjoy a special status both in the family and the larger community, and this special status may extend to all menopausal women of the voodoo-ethnicities. The results of our quantitative analysis indeed reveal that, for those ethnic groups, menopause increased women's involvement in household decision-making. We propose two specific channels that could explain such increased involvement: the 'income factor' and the 'fear factor'.

### *Income factor*

We hypothesize that her higher status and particular role in the community could provide the menopausal woman with greater access to income-increasing opportunities, e.g. through a larger social network or because people reward the tassimon and her assistants for their (ceremonial) services. According to conventional intra-household models (e.g. Basu, 2006; Browning et al, 1994) the higher income, in its turn, could affect the woman's threat point in intra-household bargaining. To tentatively test for this channel, we add a dummy variable to Eq. 4 capturing whether a woman earns the same or more money than her husband.<sup>25</sup> Results in Table 13 show that earning the same or more money than her husband significantly (at 1%) and sizeably increases a woman's AI (0.491)

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<sup>24</sup> We also explored whether the tassimon effect is rooted in persistent cultural beliefs or whether it is transmitted through specific local institutions. However, due to lack of a critical mass of 'voodoo women' outside 'voodoo land', the test we designed has no power and is referred to Appendix 13.

<sup>25</sup> This information is based on the DHS variable v746 : "respondent earns more than husband/partner", with answer categories: more than him, less than him, about the same and husband/partner doesn't bring in money. The DHS also provides information on the woman's labor participation, but at a 99.83% of participation, there is too little variation for this variable to be useful.

and her participation in decisions regarding large purchases (0.177). However, our coefficient of interest that measures the tassinon effect is only marginally affected by the inclusion of this variable, more specifically with a slight diminution of the tassinon effect of -1.38 per cent for AI and -1.92 per cent for large purchases. Hence, while the income effect clearly is important for intra-household bargaining, it seems to operate largely independently from the tassinon effect.

### *Fear factor*

We hypothesize that a husband considers his menopausal spouse more highly because of her alleged supernatural powers. This channel is conditional on the husband's belief in human agency in the harnessing of supernatural powers. The DHS survey includes one question<sup>26</sup> that provides us with a proxy of such belief, i.e. whether "HIV can be transmitted by witchcraft or supernatural means". The answer categories are: 'no', 'yes' and 'don't know'. A direct comparison of the tassinon effect across subsamples of women whose husbands believe AIDS can be caused by witchcraft and women whose husband do not believe so, would be plagued by selection bias. For instance, in our sample we find that those who believe HIV can be transmitted by witchcraft are less educated, tend to live more in rural areas, and are less wealthy. To overcome this caveat, we first pair-matched women whose husbands believe AIDS can be caused by witchcraft to their counterparts (women whose husbands do not believe so), based on a propensity score obtained from a probit regression. In particular, we construct two subsamples that are comparable as much as possible based on observables characteristics, the only observable difference being the husband's belief. The

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<sup>26</sup> An alternative would be to compare the tassinon effect in couples with husband self-reporting to adhere to traditional religion to those who do not. However, self-reported traditional religion is not very informative about people's actual beliefs. Large numbers of African Christians and Muslims also believe in witchcraft, evil spirits, sacrifices to ancestors, reincarnation and other elements of traditional African religions (PEW, 2010). This is confirmed in our qualitative research. As such, a tassinon explains: « I am Christian, still I am the tassinon of family. I must respect the spiritual heritage of my ancestors, including the worship of *asen*. God is unique and is the same. Religions are all about peace, harmony and caring about people. I see no contradiction in being at the church early every morning and worshipping the *bennu vodoun* later that same day. [T56 : JA-Ouidah-Tassinon]». Furthermore, in our DHS sample, only 8.82% of husbands report adhering to traditional religion while 22.19% believe that AIDS can be caused by witchcraft or supernatural means and 12.35% are agnostic about it. And, among the 3,870 husbands believing that witchcraft can transmit HIV in our sample, only 11.32% are ATR adherents, 53.77% reported to be Christians and 29.61% reported to be Muslims. Because of the syncretism of individual religious beliefs, we use the more straightforward variable on the mode of HIV transmission that directly probes into a concrete magicoreligious belief about human agency over supernatural powers.

propensity score is based on variables that are likely to affect women autonomy (including among others woman's age, education) as well as factors that may be correlated with witchcraft beliefs (e.g. the percentage of husbands practicing traditional religion in the cluster of residence) with the aim to reduce as much as possible group differences in these variables so that difference in our coefficient of interest can be attributed to difference in husband belief (see details in Appendix 14). Doing so provides us with the following two samples: (i) a sample of 5,397 women with non-believing husbands, and (ii) an equal-size sample of women with either believing husbands (3,425 women) or with husband not quite sure HIV can be transmitted by witchcraft or supernatural means (1,972). Results in Table 14 indicate that the tassinon effect is much higher in the second sample. In so far the two samples indeed have similar characteristics and only differ in the husband's belief about whether HIV can be transmitted by witchcraft or supernatural means, this result provides tentative evidence for the 'fear factor'. We can however not rule out that alternative unobserved factors associated with the witchcraft belief, e.g. respect from the 'traditional', drive this result.

## **8. Conclusion**

This study relies on several rounds of DHS surveys, and a Difference-in-Differences strategy to explore the interrelation between women's autonomy, menopause and magicoreligious beliefs. Our results reveal that menopausal women gain decision power in communities of voodoo-related ethnicities, and have higher BMI. Regarding the channels, both our qualitative field work and a quantitative test suggest that this menopause-dividend is driven by magicoreligious beliefs in the supernatural powers of the tassinon.

This result entails three main contributions. First, it provides to the best of our knowledge the first quantitative support for the critique forwarded in the African feminist literature, that the concept of 'gender' in an African context is much more fluid and context-dependent than the simple man/woman dichotomy. Second, our results add to the body of both ethnographic and

quantitative studies that argue that magicoreligious beliefs continue to play a tangible role in many African societies. As demonstrated in our case study, this role also affects intra-household bargaining. While it is well documented that elderly women are often the victim of such magicoreligious beliefs (in the form of witchcraft accusation), we are the first to make explicit the positive side of the medal. Third, our analysis adds to the fast growing body of studies that demonstrate the persistence of precolonial institutions and their impact on development outcomes in SSA.

Given the demographic evolution in SSA, a better understanding of cultural attitudes towards elderly African women will become more important for policymakers in the future; as fertility declines and life expectancy increases, elderly women will increase in numbers, both in absolute and relative terms. For instance in Benin (one of the four countries of this study), a plan for active aging is implemented to provide various support to elderly with a specific focus on women (Ministère en charge des personnes âgées, 2012).

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**Figures**

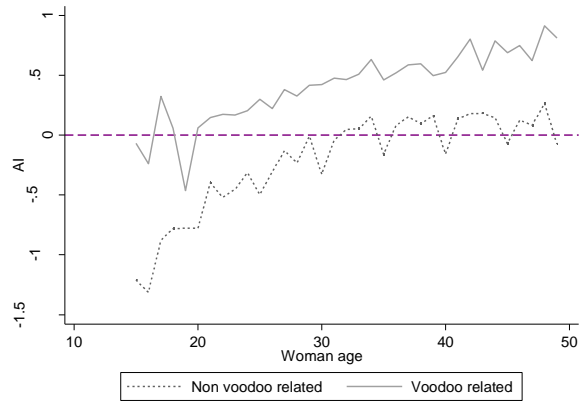
*Figure 1. Historical location of DHS ethnicities*



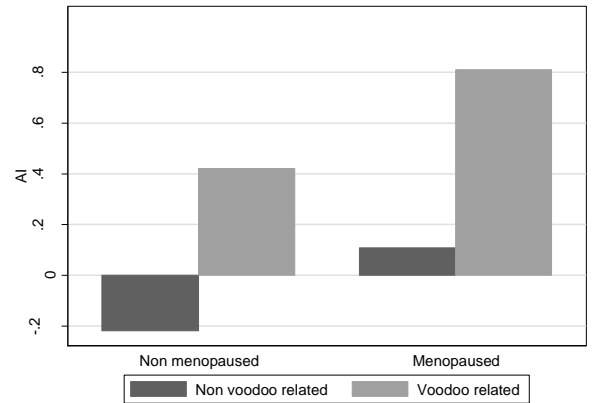
*Note.— This figure shows the historical location of the ethnicities in our DHS sample, as derived from the ethnic homeland in Murdock's database.*

Figure 2. Women's autonomy index (AI): heterogeneity with respect to age, menopause and relation to voodoo

Panel A : Average of women' AI with respect to age and relation to voodoo

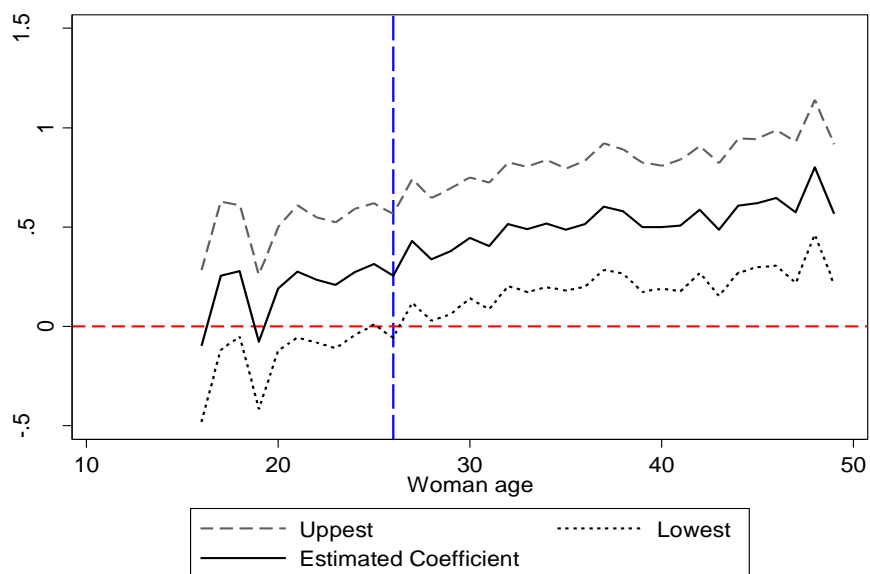


Panel B : Average of women' AI with respect to menopause status and relation to voodoo



Source : Authors, based on data from 14 DHS rounds over the period 1993-2014 in Benin (4 rounds), Nigeria (3 rounds), Togo (2 rounds) and Ghana (5 rounds).

Figure 3. The effect of age on women's autonomy



Note.— The figure shows the estimated coefficients (with 95% - CI) on the complete set of indicator variables for a woman's age, when used as regressors to explain the AI. The control variables are as specified in E. 1: couple- and woman-level characteristics (age difference between the woman and her partner, the woman's education, religion and height), husband-level characteristics (his education and an indicator variable for whether he lives together with the woman), household-level characteristics (residence area, wealth quintile, administrative region) and an indicator variables for the interview year. Standard errors are clustered at the household level and reported in parentheses.

## Tables

Table 1. Sample means and proportions of key variables

Variables	Mean/Proportion	St. Dev	Woman is not voodoo related (I)	Woman is voodoo related (II)	Difference (II)-(I)
Woman age	31.34	7.68	30.95	32.14	1.19***
Woman years of education	4.14	5.03	4.10	4.24	0.14*
Age difference (husband's age-wife's age)	7.85	5.87	8.27	7.01	-1.26***
Woman height (dm)	15.89	0.63	15.87	15.92	0.05***
Woman BMI	23.50	4.64	23.27	23.96	0.69***
Woman is voodoo related	32.77	0.47	-	-	-
Wife is menopausal	2.53	0.16	1.93	3.75	1.82***
Wife is menopausal * Woman is voodoo related	1.23	0.11	-	-	-
Percentage of women in modern activities	5.47	0.23	5.02	6.39	1.37***
Percentage of women in polygamous household	31.18	0.46	31.83	29.84	-1.99***
Labor participation	99.81	0.04	99.98	99.45	-0.53***
Autonomy in decision making about:					
<i>Use of earnings</i>	<i>89.81</i>	<i>0.30</i>	<i>88.02</i>	<i>93.46</i>	<i>5.44***</i>
<i>Seek for health care</i>	<i>50.95</i>	<i>0.50</i>	<i>45.74</i>	<i>61.62</i>	<i>15.88***</i>
<i>Visit to family</i>	<i>61.62</i>	<i>0.49</i>	<i>54.76</i>	<i>75.71</i>	<i>20.95***</i>
<i>Large purchases</i>	<i>47.57</i>	<i>0.50</i>	<i>42.09</i>	<i>58.82</i>	<i>16.73***</i>
<i>Autonomy Index (mean)</i>	<i>0.00</i>	<i>1.49</i>	<i>-0.21</i>	<i>0.44</i>	<i>0.65***</i>
Husband's years of education	6.01	5.51	5.90	6.24	0.34***
Husband living in the same house	98.60	0.12	98.79	98.21	-0.58***
Percentage of women living in urban area	35.00	0.48	29.70	45.87	16.17***
Household wealth quintiles					
<i>Poorest</i>	<i>21.66</i>		<i>26.49</i>	<i>10.39</i>	<i>-16.10***</i>
<i>Poorer</i>	<i>21.05</i>		<i>22.83</i>	<i>16.42</i>	<i>-6.41***</i>
<i>Middle</i>	<i>19.03</i>		<i>18.95</i>	<i>18.40</i>	<i>-0.55</i>
<i>Richer</i>	<i>18.88</i>		<i>16.45</i>	<i>25.26</i>	<i>8.81***</i>
<i>Richest</i>	<i>19.37</i>		<i>15.28</i>	<i>29.53</i>	<i>14.25***</i>
Wife religion					
<i>Christian</i>	<i>49.62</i>		<i>44.51</i>	<i>62.70</i>	<i>18.19***</i>
<i>Islam</i>	<i>36.85</i>		<i>48.96</i>	<i>17.16</i>	<i>-31.80***</i>
<i>Traditional</i>	<i>9.49</i>		<i>4.05</i>	<i>14.89</i>	<i>10.84***</i>
<i>Other</i>	<i>0.39</i>		<i>0.09</i>	<i>0.97</i>	<i>0.88***</i>
<i>No religion</i>	<i>3.64</i>		<i>2.38</i>	<i>4.28</i>	<i>1.90***</i>
Wife activity					
<i>Not working</i>	<i>0.17</i>		<i>0.02</i>	<i>0.55</i>	<i>0.53***</i>
<i>Professional/technical/managerial</i>	<i>4.38</i>		<i>4.42</i>	<i>5.42</i>	<i>1.00***</i>
<i>Clerical</i>	<i>0.70</i>		<i>0.61</i>	<i>0.97</i>	<i>0.36***</i>
<i>Sales</i>	<i>49.20</i>		<i>49.49</i>	<i>49.83</i>	<i>0.34</i>
<i>Agricultural - self employed</i>	<i>18.27</i>		<i>15.22</i>	<i>19.81</i>	<i>4.59***</i>
<i>Agricultural - employee</i>	<i>6.68</i>		<i>9.70</i>	<i>2.35</i>	<i>-7.35***</i>

<i>Household and domestic</i>	0.04		0.05	0.03	-0.02
<i>Services</i>	6.03		5.12	9.36	4.24***
<i>Skilled manual</i>	13.21		14.30	9.97	-4.33***
<i>Unskilled manual</i>	0.67		0.52	0.77	0.25**
<i>Others</i>	0.65		0.57	0.94	0.37***
Woman weight (10 Kgs)	5.97	1.28	5.90	6.10	0.20***
Total birth given	3.95	2.56	4.08	3.67	0.41***
Number of children who have died	0.59	1.09	0.67	0.44	0.23***
Number of husband's other wives	0.41	0.70	0.40	0.43	-0.03***
Number of under five children in the household	1.66	1.32	1.75	1.47	0.28***
Country					
<i>Benin</i>	26.67		11.50	57.77	
<i>Nigeria</i>	50.99		61.96	28.49	
<i>Togo</i>	7.57		7.46	7.77	
<i>Ghana</i>	14.78		19.07	5.97	
Year of interview					
2001	6.91		3.31	14.29	
2003	8.52		11.00	3.43	
2006	11.52		5.38	24.13	
2008	22.83		27.15	13.96	
2011	0.79		0.12	2.16	
2012	7.44		2.70	17.18	
2013	31.17		37.52	18.15	
2014	10.82		12.83	6.69	
<b>Number of observations</b>	<b>19.471</b>		<b>13.090</b>	<b>6.381</b>	

Source : Authors, based on data from 14 DHS rounds in the period 1993-2014 in Benin (4 rounds), Nigeria (3 rounds), Togo (2 rounds) and Ghana (5 rounds). Modern activities include professional/ technical/ managerial and clerical activities.

Table 2. Classification of DHS ethnicities and corresponding Murdock classification according to voodoo affiliation

Voodoo related ethnicities		Non voodoo related ethnicities	
DHS	Murdock classification	DHS	Murdock classification
Adja	Fon	Akan	Ashanti
Ewe	Ewe	Akposso/akebou	
Fon	Fon	Ana-ife	
Yoruba	Yoruba	Bariba	
		Betamaribe	Somba
		Dendi	
		Ekoi	Ekoi
		Fulani	
		Ga/dangme	Ga
		Grusi	Dagomba
		Guan	Dagomba
		Gurma	Dagomba
		Hausa	
		Ibibio	Ibibio
		Igala	Igala
		Igbo	Ibo
		Ijaw/ izon	Ijaw
		Kabye/tem	Tem
		Kanuri/ beriberi	
		Mole-dagbani	Dagomba
		Para-gourma/akan	
		Peuhl	
		Tiv	Tiv
		Yoa	Somba
<b>N = 4</b>	<b>N=3</b>	<b>N = 24</b>	<b>N=11</b>

Source : Authors, based on Murdock's classification and ethnicities in our DHS sample. We matched the ethnicities mentioned in the DHS with those named in Murdock's database, relying on the correspondence tables from the Ethnic Power Relations (EPR) database (Wimmer et al. 2009). We could match 21 DHS ethnicities (out of the 28) with 14 ethnicities in Murdock's database. We end up with three instead of four voodoo-ethnicities, because in Murdock's classification, Adja and Fon are grouped together as Fon, while Ewe and Yoruba ethnicities are considered separately.

Table 3. Comparison of historical characteristics across the voodoo and non-voodoo ethnicities

	Voodoo related ethnicities N= 3	Non voodoo related ethnicities N=11
<i>Dependence on agriculture</i>		
36-45% dependence	0	1
46-55% dependence	1	2
56-65% dependence	1	1
66-75% dependence	0	5
76-85% dependence	1	1
86-100% dependence	0	1
<i>Animal and plough cultivation</i>		
Absent	3	11
<i>Jurisdictional hierarchy beyond the local community</i>		
No levels	0	3
One levels	0	3
Two levels	1	3
Three levels	2	2
<i>Political integration</i>		
Insufficient information	1	9
Minimal states	0	1
States	2	1
<i>Type of society</i>		
Patrilineal	2	7
Duolateral	0	2
Ambilineal	0	1
Mixed	1	1
<i>Polygamy</i>		
Polygynous: unusual co-wives	0	1
Polygynous: usual co-wives	1	1
Small extended families	0	3
Large extended families	2	6
<i>Average distance to coastal line (in Km)</i>		
	108	338

Source : Authors, based on Murdock's classification and a distance calculation in ArcGIS.



Table 4. Cross cultural heterogeneity in the effect of age and menopause on women's autonomy

	DEPENDENT VARIABLES : AUTONOMY INDEX				
	(I)	(II)	(III)	(IV)	(V)
Woman age	0.017*** (.001)	0.015*** (.002)	0.017*** (.001)	0.017*** (.001)	0.015*** (.002)
Woman is menopausal			0.050 (.060)	-0.099 (.084)	-0.074 (.085)
Woman is voodoo related		-0.072 (.099)		0.175*** (.040)	-0.028 (.102)
Woman age* Woman is voodoo related		0.008*** (.003)			0.006** (.003)
Woman is menopausal * Woman is voodoo related				0.302*** (.114)	0.220* (.119)
Woman education	0.033*** (.003)	0.032*** (.003)	0.033*** (.003)	0.032*** (.003)	0.032*** (.003)
R-squared	0.231	0.232	0.231	0.232	0.232
Observations	19,471	19,471	19,471	19,471	19,471

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. Control variables include woman-level characteristics (education, religion and height), husband-level characteristics (education and an indicator variable for whether he lives together with the woman), the age difference between the spouses, household-level characteristics (residence area, wealth quintile), and indicator variables for the administrative region of residence of the household and for the year in which the DHS survey took place. Standard errors are clustered at the household level and reported in parentheses.

Table 5. Cross cultural heterogeneity in the effect of menopause on women's body mass index

	DEPENDENT VARIABLE : WOMEN' BODY MASS INDEX		
	(I)	(II)	(III)
Woman age	0.101*** (.007)	0.100*** (.007)	0.104*** (.007)
Woman is voodoo related	-0.309** (.135)	-0.210 (.155)	-0.228 (.168)
Woman is menopausal	-1.247*** (.277)	-1.333*** (.290)	-1.718 (1.151)
Woman is menopausal * Woman is voodoo related	0.939** (.419)	1.059** (.428)	1.191** (.479)
Woman education	0.073*** (.011)	0.065*** (.013)	0.069*** (.013)
R-squared	0.210	0.216	0.219
Observations	19,180	16,239	16,239

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. To control variables specified in the note of Table 4, we here add woman's weight, an indicator variable for her occupation, the total number of births given by her and the number of her children who have died to the vector of woman-level characteristics  $X_w$ ; the number of household head's other wives and the number of under-five years olds children in the household to the set of household level characteristics  $X_h$ . Standard errors are clustered at the household level and reported in parentheses. Results in Col.1 are based on the whole sample while Cols II and III are based on the subsample for which longitude and latitude of the homeland of the ethnic group are available. At the difference of Col. II, we include latitude, longitude, latitude\*menopause and longitude\*menopause in Col. III.

Table 6. Summary of robustness checks

	DEPENDENT VARIABLES : AUTONOMY INDEX					
	(I)	(II)	(III)	(IV)	(V)	(VI)
Woman is voodoo related	0.172*** (.040)	0.175*** (.054)	0.175*** (.093)	0.179*** (.040)	0.175*** (.040)	0.159*** (.037)
Woman is menopausal *	0.304*** (.114)	0.302*** (.116)	0.302*** (.093)	0.289** (.113)	0.345*** (.132)	0.269*** (.103)
Woman education	0.032*** (.003)	0.032*** (.004)	0.032*** (.005)	0.027*** (.003)	0.032*** (.003)	0.029*** (.003)
<b>Controls as in baseline Eq. 4</b>	YES	YES	YES	YES	YES	YES
<b>Controls of robustness checks and competing explanations</b>						
<i>Non parametric relationship between AI and Woman Age squared</i>	YES					
<i>SE clustered at DHS cluster level</i>		YES				
<i>SE clustered at administrative region level</i>			YES			
<i>Endogenous controls</i>				YES		
<i>Country FE interacted with woman age and menopause status</i>					YES	
<i>AI defined as sum</i>						YES
R-squared	0.202	0.232	0.232	0.235	0.232	0.222
Observations	19,471	19,471	19,471	19,327	19,471	19,471

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— Detailed results of robustness checks are reported in Appendix 2 to 6.

Table 6. Determinants of menopause occurrence

	DEPENDENT VARIABLE : MENOPAUSE STATUS			
	All Women	Women of 40 and +	All Women	Women of 40 and +
Woman age	0.009*** (.000)	0.037*** (.002)	0.012*** (.000)	0.042*** (.003)
Woman height	-0.001 (.002)	0.011 (.009)	0.001 (.003)	0.017 (.014)
Woman weight	-0.003*** (.001)	-0.005 (.005)	-0.002 (.002)	0.004 (.007)
Age at first marriage	-0.005*** (.000)	-0.010*** (.001)	-0.006*** (.001)	-0.011*** (.002)
Number of births given	-0.011*** (.001)	-0.012*** (.002)	-0.014*** (.002)	-0.016*** (.004)
Haemoglobin level			-0.000 (.000)	0.001 (.001)
Anaemia level			-0.005 (.006)	-0.016 (.025)
<i>Controls :</i>				
<i>Woman' activity</i>				
<i>Administrative region of residence</i>				
<i>Wealth quintile of the household</i>				
<i>Year in which the DHS round took place</i>				
	Yes	Yes	Yes	Yes
R-squared	0.103	0.152	0.127	0.156
Observations	19,467	3,435	9,023	1,859

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. We control for woman' activity, the administrative region of residence and the wealth quintile of the household and also for the year in which the DHS round took place. In Col (II) we add haemoglobin level and anaemia level of the woman measured at the time of the survey, considerable reducing the sample. Standard errors are clustered at the household level and reported in parentheses. Age at first marriage captures the effect of age at menarche, on which information is lacking in the DHS.

Table 8. Summary of tests for competing explanations

	DEPENDENT VARIABLES : AUTONOMY INDEX		
	(I)	(II)	(III)
Woman is voodoo related	0.313*** (.052)	0.178*** (.040)	0.123** (.052)
Woman is menopausal *	0.281** (.114)	0.299*** (.114)	0.325** (.151)
Woman is voodoo related	0.035*** (.004)	0.031*** (.003)	0.028*** (.003)
Woman education			
<b>Controls as in baseline Eq. 4</b>	YES	YES	YES
<b>Controls of robustness checks and competing explanations</b>	YES		
<i>Modernization factors interacted with woman is voodoo related</i>			
<i>Polygamy interacted with menopause status</i>		YES	
<i>Coastal distance interacted with menopause status</i>			YES
R-squared	0.233	0.234	0.262
Observations	19,471	19,331	16,079

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— Detailed results of competing explanations are reported in Appendix 7 to 9.

Table 9. Tassinon effect on women autonomy using IV

2 <sup>ND</sup> STAGE		
DEPENDENT VARIABLE : AUTONOMY INDEX		
Woman age		0.016*** (.001)
Woman is voodoo related		0.278*** (.062)
Woman is menopausal		-0.172* (.101)
Woman is menopausal * Woman is voodoo related		0.421*** (.144)
Woman education		0.028*** (.003)
<i>R-squared</i>		0.257
<i>Observations</i>		16,506
1 <sup>ST</sup> STAGE DEPENDANT VARIABLES		
	Woman is voodoo related	Woman is menopausal * Woman is voodoo related
Distance of homeland to voodoo Institutional centers	-0.125*** (.003)	0.002*** (.000)
Woman is menopausal * Distance of homeland to voodoo Institutional centers	0.016** (.007)	-0.162*** (.009)
<i>F-statistic (excluded instrument)</i>	889.05	504.24
<i>Under identification test p-value</i>		0.000
<i>Weak identification test: Kleibergen-Paap Wald rk F statistic</i>		883.35
<i>(Stock-Yogo critical values)</i>		(7.03)

***Ho: equation is weakly identified***

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses. At the difference of Col. (I), Col. (II) includes the interaction term *Woman age \* Woman is voodoo related* as in (Eq.5).

Table 10. Tassinon effect and multidimensionality of women autonomy

	DEPENDENT VARIABLES			
	Use of earnings (I)	Seek for health care (II)	Visit to family (III)	Large purchases (IV)
Woman age	0.002*** (.000)	0.005*** (.000)	0.004*** (.000)	0.005*** (.001)
Woman is voodoo related	0.013 (.009)	0.029** (.014)	0.077*** (.013)	0.040*** (.014)
Woman is menopausal	-0.022 (.020)	-0.022 (.030)	0.010 (.030)	-0.060** (.030)
Woman is menopausal *	0.011 (.026)	0.067 (.041)	0.047 (.037)	0.144*** (.042)
Woman is voodoo related	0.002*** (.001)	0.010*** (.001)	0.007*** (.001)	0.010*** (.001)
Woman education				
<i>R-squared</i>	0.060	0.181	0.187	0.190
<i>Observations</i>	19,471	19,471	19,471	19,471

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses.

Table 11. Full and partial and full autonomy with respect to the dimension of autonomy

	DEPENDENT VARIABLES			
	Use of earnings (I)	Seek for health care (II)	Visit to family (III)	Large purchases (IV)
	FULL AUTONOMY			
Woman is menopausal *	-0.012	-0.020	-0.035	0.008
Woman is voodoo related	(.038)	(.039)	(.035)	(.032)
<i>R-squared</i>	<i>0.153</i>	<i>0.083</i>	<i>0.067</i>	<i>0.054</i>
<i>Observations</i>	<i>19,471</i>	<i>19,471</i>	<i>19,471</i>	<i>19,471</i>
	PARTIAL AUTONOMY			
Woman is menopausal *	0.067	0.113**	0.077*	0.157***
Woman is voodoo related	(.082)	(.048)	(.043)	(.046)
<i>R-squared</i>	<i>0.134</i>	<i>0.180</i>	<i>0.181</i>	<i>0.188</i>
<i>Observations</i>	<i>5,834</i>	<i>16,987</i>	<i>17,135</i>	<i>17,764</i>

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses.



Table 12. Heterogeneity of tassinon effect across country

	DEPENDENT VARIABLE: AUTONOMY INDEX			
	Benin (I)	Ghana (II)	Nigeria (II)	Togo (IV)
Woman is menopausal *	0.378*	0.625*	0.352	0.130
Woman is voodoo related	(.204)	(.368)	(.246)	(.338)
<i>R-squared</i>	0.148	0.235	0.263	0.046
<i>Observations</i>	5,192	2,877	9,929	1,473

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses.

Table 13. Transmission channel: income factor?

	DEPENDENT VARIABLES			
	Autonomy index (I)	Large purchases (II)	Autonomy index (III)	Large purchases (IV)
Woman is menopausal*	0.289**	0.104*	0.285**	0.102*
Woman is voodoo related	(.141)	(.053)	(.139)	(.052)
Woman earn same or more than husband			0.491***	0.177***
			(.034)	(.012)
<i>R-squared</i>	0.272	0.225	0.282	0.237
<i>Observations</i>	14,199	14,199	14,199	14,199

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses.

Table 14. Transmission channel: fear factor ?

	DEPENDENT VARIABLES					
	<i>Husband does not believe HIV can be transmitted by witchcraft or supernatural means</i>		<i>Husband believes HIV can be transmitted by witchcraft or supernatural means</i>		<i>Husband believes or is uncertain HIV can be transmitted by witchcraft or supernatural means</i>	
	Autonomy index (I)	Large purchases (II)	Autonomy index (III)	Large purchases (IV)	Autonomy index (V)	Large purchases (VI)
	<b>PANEL I : FULL SAMPLE</b>					
Woman is menopausal* Woman is voodoo related	0.320 (.200)	0.202*** (.075)	0.690*** (.225)	0.313*** (.088)	0.591*** (.209)	0.272*** (.074)
<i>R-squared</i>	0.230	0.177	0.167	0.148	0.198	0.173
<i>Observations</i>	5,397	5,397	3,425	3,425	5,397	5,397
	<b>PANEL II : ONLY VOODOO RELATED ETHNIC GROUPS</b>					
Woman is menopausal* Woman is voodoo related <sup>(b)</sup>	0.247* (.152)	0.137 (.058)	0.445*** (.158)	0.167*** (.064)	0.284* (.151)	0.106* (.055)
<i>R-squared</i>	0.089	0.078	0.124	0.116	0.101	0.094
<i>Observations</i>	1,727	1,727	1,123	1,123	1,676	1,676

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses. To avoid selection bias issues in our comparison, the subsamples in Cols (1) and (2) comprise couples in which the husband does not believe HIV can be transmitted by witchcraft or supernatural means that are matched to couples in which the husband does. The matching is based on a propensity score obtained from a probit regression of the likelihood to believe HIV can be transmitted by witchcraft or supernatural means. <sup>(b)</sup> Here the tassinon effect is exactly the menopause effect.

## APPENDIX

*Appendix 1. Kaiser-Meyer-Olkin measure of sampling adequacy (Assessment of the Principal Component Analysis)*

<b>Variables</b>	<b>KMO</b>
Use of earnings	0.860
Seek for health care	0.692
Visit to family	0.768
Large purchases	0.695
Overall	0.718

*Note : The Kaiser–Meyer–Olkin measure of sampling adequacy compares the correlations and the partial correlations between variables. If the partial correlations are relatively high compared to the correlations, the KMO measure is small, and a low-dimensional representation of the data is not possible. Kaiser (1974) characterization of KMO values is as follows : 0.00 to 0.49 unacceptable; 0.50 to 0.59 miserable; 0.60 to 0.69 mediocre; 0.70 to 0.79 middling; 0.80 to 0.89 meritorious; 0.90 to 1.00 marvellous.*

Appendix 2. Effect of tassinon status on women's autonomy (Robustness check 1: semi-parametric estimation)

	DEPENDENT VARIABLES : AUTONOMY INDEX	
	(I)	(II)
Woman is voodoo related	0.172*** (.040)	-0.068 (.104)
Woman is menopausal	-0.040 (.086)	-0.015 (.087)
Woman is menopausal * Woman is voodoo related	0.304*** (.114)	0.207* (.119)
Woman age * Woman is voodoo related		0.008** (.003)
Woman education	0.032*** (.003)	0.032*** (.003)
R-squared	0.202	0.202
Observations	19,471	19,471

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses. The semi-parametric estimation allows for a non-parametrical relationship between AI and Woman age. At the difference of Col. (I), Col. (II) includes the interaction term Woman age \* Woman is voodoo related as in (Eq.5).

Appendix 3. Cross cultural heterogeneity in the effect of age and menopause on women's autonomy ((Robustness checks 2 and 3 : various level of SE clustering)

	DEPENDENT VARIABLES : AUTONOMY INDEX				
	(I)	(II)	(III)	(IV)	(V)
<b>Panel A : Robust SE clustered at DHS cluster level</b>					
Woman age	0.017*** (.001)	0.015*** (.002)	0.017*** (.001)	0.017*** (.001)	0.015*** (.002)
Woman is menopausal			0.050 (.061)	-0.099 (.085)	-0.074 (.086)
Woman is voodoo related		-0.072 (.111)		0.175*** (.054)	-0.028 (.114)
Woman age* Woman is voodoo related		0.008*** (.003)			0.006** (.003)
Woman is menopausal * Woman is voodoo related				0.302*** (.116)	0.220* (.121)
Woman education	0.033*** (.004)	0.032*** (.004)	0.033*** (.004)	0.032*** (.004)	0.032*** (.004)
<i>R-squared</i>	0.231	0.232	0.231	0.232	0.232
<i>Observations</i>	19,471	19,471	19,471	19,471	19,471
<b>Panel B : Robust SE clustered at country administrative region level</b>					
Woman age	0.017*** (.003)	0.015*** (.003)	0.017*** (.003)	0.017*** (.003)	0.015*** (.003)
Woman is menopausal			0.050 (.064)	-0.099 (.088)	-0.074 (.091)
Woman is voodoo related		-0.072 (.170)		0.175*** (.093)	-0.028 (.170)
Woman age* Woman is voodoo related		0.008** (.003)			0.006 (.004)
Woman is menopausal * Woman is voodoo related				0.302*** (.093)	0.220** (.110)
Woman education	0.033*** (.005)	0.032*** (.005)	0.027*** (.005)	0.032*** (.005)	0.032*** (.005)
<i>R-squared</i>	0.231	0.232	0.231	0.232	0.232
<i>Observations</i>	19,471	19,471	19,471	19,471	19,471

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. Control variables include woman-level characteristics (education, religion and height), husband-level characteristics (education and an indicator variable for whether he lives together with the woman), the age difference between the spouses, household-level characteristics (residence area, wealth quintile), and indicator variables for the administrative region of residence of the household and for the year in which the DHS survey took place. Standard errors are clustered at DHS cluster level in panel A and at country administrative region level in panel B and are reported in parentheses.

*Appendix 4. Effect of tassinon status on women's autonomy with potentially endogenous controls (Robustness check 4)*

<b>DEPENDENT VARIABLE : AUTONOMY INDEX</b>		
	(I)	(II)
Woman age	0.015*** (.002)	0.013*** (.002)
Woman is voodoo related	0.179*** (.040)	-0.003 (.103)
Woman is menopausal	-0.100 (.085)	-0.077 (.085)
Woman is menopausal * Woman is voodoo related	0.289** (.113)	0.215* (.119)
Woman age * Woman is voodoo related	[REDACTED]	0.006* (.003)
Woman education	0.027*** (.003)	0.027*** (.003)
<i>R-squared</i>	0.235	0.236
<i>Observations</i>	19,327	19,327

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Note.*— The sample includes 15-49 women in couple. To controls variables specified in the note of Table 4, we here add woman's weight, an indicator variable for her occupation, the total number of births given by her and the number of her children who have died to the vector of woman-level characteristics  $X_w$ ; the number of household head's other wives and the number of under-five years olds children in the household to the set of household level characteristics  $X_b$ . Standard errors are clustered at the household level and reported in parentheses. At the difference of Col. (I), Col. (II) includes the interaction term  $Woman\ age * Woman\ is\ voodoo\ related$  as in (Eq.5).

Appendix 5. Effect of tassinon status on women's autonomy while including country FE and its interaction terms woman age and menopause status (Robustness check 5)

	DEPENDENT VARIABLE : AUTONOMY INDEX	
	(I)	(II)
Woman age _Benin	0.021*** (.003)	0.017*** (.004)
Woman age _Togo	0.019*** (.005)	0.017*** (.005)
Woman age _Ghana	0.022*** (.003)	0.021*** (.003)
Woman age _Nigeria	0.013*** (.002)	0.012*** (.002)
Woman is voodoo related	0.175*** (.040)	0.012 (.116)
Woman is menopausal_Benin	-0.240* (.137)	-0.195 (.140)
Woman is menopausal_Togo	0.156 (.187)	0.175 (.188)
Woman is menopausal_Ghana	-0.174 (.131)	-0.165 (.131)
Woman is menopausal_Nigeria	-0.084 (.134)	-0.073 (.134)
Woman is menopausal *	0.345***	0.279**
Woman is voodoo related	(.132)	(.138)
Woman age * Woman is voodoo related		0.005 (.003)
Woman education	0.032*** (.003)	0.032*** (.003)
Togo <sup>(b)</sup>	-0.237 (.237)	-0.212 (.237)
R-squared	0.232	0.232
Observations	19,471	19,471

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses. <sup>(c)</sup> Other country FE dummies are omitted because of multicollinearity. At the difference of Col. (I), Col. (II) includes the interaction term Woman age \* Woman is voodoo related as in (Eq.5).



*Appendix 6. Cross cultural heterogeneity in the effect of age and menopause on women's autonomy defined as a sum (Robustness check 6)*

	DEPENDENT VARIABLES : AUTONOMY INDEX				
	(I)	(II)	(III)	(IV)	(V)
Woman age	0.016*** (.001)	0.013*** (.001)	0.015*** (.001)	0.015*** (.001)	0.014*** (.002)
Woman is menopausal			0.038 (.055)	-0.095 (.077)	-0.073 (.077)
Woman is voodoo related		-0.053 (.090)		0.159*** (.037)	-0.013 (.093)
Woman age* Woman is voodoo related		0.007*** (.002)			0.005** (.003)
Woman is menopausal * Woman is voodoo related				0.269*** (.103)	0.199* (.108)
Woman education	0.029*** (.003)	0.029*** (.003)	0.030*** (.003)	0.029*** (.003)	0.029*** (.003)
R-squared	0.221	0.222	0.221	0.222	0.232
Observations	19,471	19,471	19,471	19,471	19,471

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Note.— The sample includes 15-49 women in couple. Control variables include woman-level characteristics (education, religion and height), husband-level characteristics (education and an indicator variable for whether he lives together with the woman), the age difference between the spouses, household-level characteristics (residence area, wealth quintile), and indicator variables for the administrative region of residence of the household and for the year in which the DHS survey took place. Standard errors are clustered at the household level and reported in parentheses.*

Appendix 7. Effect of tassinon status on women's autonomy while controlling for modernization factors (Competing explanation 1)

	DEPENDENT VARIABLE : AUTONOMY INDEX	
	(I)	(II)
Woman age	0.017*** (.001)	0.015*** (.002)
Woman is voodoo related	0.313*** (.052)	0.100 (.107)
Woman is menopausal	-0.091 (.084)	-0.064 (.085)
Woman is menopausal *	0.281** (.114)	0.194 (.119)
Woman is voodoo related		0.007** (.003)
Woman age * Woman is voodoo related		
Woman education	0.035*** (.004)	0.035*** (.004)
Woman education *	-0.022*** (.006)	-0.022*** (.006)
Woman is voodoo related	0.165*** (.060)	0.171*** (.060)
Woman is in modern activity	-0.005 (.094)	-0.018 (.094)
Woman is in modern activity *		
Woman is voodoo related		
R-squared	0.233	0.233
Observations	19,471	19,471

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses. At the difference of Col. (I), Col. (II) includes the interaction term *Woman age \* Woman is voodoo related* as in (Eq.5).

Appendix 8. Effect of tassinon status on women's autonomy while controlling for polygamy and its interaction term with menopause (Competing explanation 2)

	DEPENDENT VARIABLE : AUTONOMY INDEX	
	(I)	(II)
Woman age	0.018*** (.001)	0.016*** (.002)
Woman is voodoo related	0.178*** (.040)	-0.032 (.102)
Woman is menopausal	-0.141 (.096)	-0.115 (.097)
Polygamy	-0.142*** (.025)	-0.143*** (.025)
Woman is menopausal* Polygamy	0.107 (.118)	0.107 (.117)
Woman is menopausal *	0.299*** (.114)	0.213* (.120)
Woman is voodoo related		
Woman age * Woman is voodoo related		0.007** (.003)
Woman education	0.031*** (.003)	0.031*** (.003)
R-squared	0.234	0.234
Observations	19,331	19,331

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses. At the difference of Col. (I), Col. (II) includes the interaction term *Woman age \* Woman is voodoo related* as in (Eq.5).

Appendix 9. Effect of tassinon status on women's autonomy including historical location and its interaction term with menopause (Competing explanation 3)

	DEPENDENT VARIABLE : AUTONOMY INDEX		
	(I)	(II)	(III)
Woman age	0.016*** (.001)	0.016*** (.001)	0.012*** (.002)
Woman is voodoo related	0.209*** (.048)	0.123** (.052)	-0.211* (.111)
Woman is menopausal	-0.127 (.092)	-0.117 (.153)	-0.073 (.154)
Woman is menopausal *	0.335*** (.119)	0.325** (.151)	0.193 (.155)
Woman is voodoo related			0.010*** (.003)
Woman age * Woman is voodoo related			
Woman is menopausal * Distance to coastal line		0.000 (.000)	0.000 (.000)
Distance to coastal line		-0.000*** (.000)	-0.000*** (.000)
Woman education	0.028*** (.003)	0.028*** (.003)	0.027*** (.003)
R-squared	0.262	0.262	0.263
Observations	16,079	16,079	16,079

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample is here restricted to a subsample of 15-49 women in couple for which distance from historical homeland of ethnic group to coastal line could be computed. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses. Col. (I) serves as baseline to assess how inclusion of distance to coastal line and its interaction term with menopause status in Col. (II) affects our coefficient of interest. At the difference of Col. (II), Col. (III) includes the interaction term Woman age \* Woman is voodoo related as in (Eq.5).

	<b>DEPENDENT VARIABLES : PROBABILITY TO REMAIN MARRIED</b>				
	All Women	Women of 40 and +	All Women	Women of 40 and +	Menopausal Women only
Woman age	-0.001*** (.000)	-0.003** (.001)	-0.001*** (.000)	-0.003*** (.001)	-0.003* (.002)
Woman is voodoo related	-0.008 (.006)	-0.018 (.012)	-0.008 (.006)	-0.018 (.012)	0.040 (.034)
Woman is menopausal			-0.015** (.007)	0.010 (.008)	
Woman education	-0.005*** (.000)	-0.004*** (.001)	-0.005*** (.000)	-0.004*** (.004)	-0.003 (.003)
<i>R-squared</i>	0.082	0.075	0.082	0.076	0.107
<i>Observations</i>	86,634	18,502	86,634	18,502	2,689

*Appendix 11. Tassinon effect and multidimensionality of women autonomy using extensive equation (Eq.5)*

	DEPENDENT VARIABLES			
	Use of earnings (I)	Seek for health care (II)	Visit to family (III)	Large purchases (IV)
Woman age *	-0.000	0.002**	0.001	0.003**
Woman is voodoo related	(.000)	(.001)	(.001)	(.001)
Woman is menopausal *	0.016	0.039	0.032	0.111**
Woman is voodoo related	(.027)	(.043)	(.039)	(.043)
<i>R-squared</i>	<i>0.060</i>	<i>0.182</i>	<i>0.187</i>	<i>0.191</i>
<i>Observations</i>	<i>19,471</i>	<i>19,471</i>	<i>19,471</i>	<i>19,471</i>

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses.*

*Appendix 12. Cross cultural heterogeneity in the effect of menopause age on women's autonomy while dropping large purchases*

<b>DEPENDENT VARIABLE : AUTONOMY INDEX</b>		
	(I)	(II)
Woman age	0.014*** (.001)	0.012*** (.001)
Woman is voodoo related	0.159*** (.035)	0.033 (.088)
Woman is menopausal	-0.041 (.073)	-0.026 (.074)
Woman is menopausal * Woman is voodoo related	0.166* (.097)	0.115 (.101)
Woman age * Woman is voodoo related		0.004 (.002)
Woman education	0.025*** (.003)	0.025*** (.003)
<i>R-squared</i>	<i>0.203</i>	<i>0.203</i>
<i>Observations</i>	<i>19,471</i>	<i>19,471</i>

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Note.— The sample includes 15-49 women in couple. Here, the Autonomy Index results from a PCA based on Use of woman's earnings, Seek for care for her health and Visits to family and relatives. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses.*

*Appendix 13. Level of transmission: interpersonal or institutional ?*

In this appendix, we assess whether the tassinon effect is rooted in persistent cultural beliefs or whether it is transmitted through specific local institutions.

The awe for the tassinon could be transmitted from one generation to the other in two distinct ways, the first one operating at the individual level through parental education, the other one via the institutional environment beyond the family level. In the former case, we expect to find the tassinon effect also for voodoo-related individuals who no longer live in their historic ethnic homelands, whereas in the latter case, we expect the tassinon effect to be more pronounced in the historic ethnic homelands, even for immigrants belonging to ethnicities who are not related to voodoo.

To assess the relative importance of persistent cultural beliefs versus specific localized institutions, we include the variable *Woman lives in homeland of voodoo ethnicities<sub>w</sub>* and the interaction term *Menopause<sub>w</sub> \* Woman lives in homeland of voodoo ethnicities<sub>w</sub>* in our Eq. 4. The latter term captures the effect of specific local institutions while *Menopause<sub>w</sub> \* Voodoo ethnicity<sub>w</sub>* captures transmission through individual beliefs. The results, shown in Table 11, only provide support for the institutional mode of transmission. However, these should be taken with a grain of salt because of important multicollinearity stemming from the high correlation (0.908) between the two interaction terms.<sup>27</sup> The lack of a critical mass of ‘voodoo women’ outside ‘voodoo land’ could drive the absence of evidence for individual-level transmission.

<b>DEPENDENT VARIABLE : AUTONOMY INDEX</b>	
Woman age	0.017*** (.001)
Woman lives in homeland of voodoo ethnicities	0.382*** (.089)
Woman is voodoo related	0.183*** (.040)
Woman is menopausal	-0.125 (.086)
Woman is menopausal* Woman lives in homeland of voodoo ethnicities	0.346* (.188)
Woman is menopausal* Woman is voodoo related	0.017 (.189)
Woman education	0.032*** (.003)
<i>R-squared</i>	0.232
<i>Observations</i>	19,471

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses.*

<sup>27</sup> 91.88% of menopausal women living in the historic homeland of voodoo ethnicities also belong to voodoo-related ethnicities, and 90.70% of menopausal women living outside these homelands are of non-voodoo ethnicities. The largest Variance Inflation Factor after the regression including both terms is 37.79 so greater than 10 (commonly used as rule of thumb) and the multicollinearity test by Farrar and Glauber (1967) further confirms multicollinearity issues when simultaneously including the two interactions terms (p-value=0.000).



<b>DEPENDENT VARIABLE : HUSBAND BELIEVES OR IS UNCERTAIN THAT HIV CAN BE TRANSMITTED BY SUPERNATURAL MEANS</b>	
Husband education	-0.049*** (.003)
Wife education	-0.010*** (.003)
Age difference between spouses	-0.005*** (.002)
Wealth quintile (Poorest)	
<i>Poorer</i>	-0.107*** (.036)
<i>Middle</i>	-0.056 (.039)
<i>Richer</i>	-0.110** (.044)
<i>Richest</i>	-0.136** (.054)
Pseudo R-squared	0.070
Observations	17,338
Percentage of correct classification	68.47

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note.— The sample includes 15-49 women in couple. Control variables include woman-level characteristics (age, total number of birth given by her, number of her children who have died), husband-level characteristics (an indicator variable for whether he lives together with the woman), household-level characteristics (residence area, wealth quintile, number of under five years children in the household, number of co-wives), share of husbands practicing traditional religion in the cluster of residence, indicator variables for the administrative region of residence and the year in which the DHS survey took place. Standard errors are clustered at the household level and reported in parentheses.